

AMENDMENTS TO THE CLAIMS

1. (currently amended) A temperature control method of controlling a heating apparatus, ~~having including~~ at least two heating zones, so as to adjust temperatures detected at predetermined locations to a target ~~value therefor~~ temperature, said method, comprising:

detecting temperatures at said predetermined locations ~~[[the]]~~, a number of which is larger than ~~[[the]]~~ a number of said at least two heating zones and at least one of which is located in each of said at least two heating zones; and

controlling said heating apparatus in such a manner that said target temperature, detected at said predetermined locations, falls between a maximum value and a minimum value ~~of a plurality of temperatures detected at a plurality of detected predetermined locations~~.

wherein power supplies of said at least two heating zones are independently adjusted.

2. (currently amended) The temperature control method according to claim 1, wherein first temperature detectors are disposed at first predetermined locations corresponding to said ~~respective~~ at least two heating zones and are used for a temperature control method of controlling said heating apparatus in such a manner that temperatures detected by said first temperature detectors equal a first target temperature,

wherein second temperature detectors are disposed at second predetermined locations, which are located closer to a treatment target than said first predetermined locations, to obtain an interference matrix, M , as well as differences, $P_{0\alpha}$ between a second target temperature for said second temperature detectors and temperatures detected by said second temperature detectors, said interference matrix, M ~~being a matrix of~~, including coefficients indicative ~~of the extents~~ of variations of temperatures detected by said second temperature detectors, when said first target temperature for said first temperature detector is varied,

wherein said second temperature detectors detect temperatures at said second predetermined locations, a number of which is larger than a number of said at least two heating zones and at least one of which is located in each of said at least two heating zones, and control said heating apparatus in such a manner that said target temperature detected at

said second predetermined locations falls between a maximum value and a minimum value,
and

wherein said first target temperature is corrected on ~~[[the]]~~ a basis of said interference matrix, M , and said errors, P_0 .

3. (currently amended) The temperature control method according to claim 2, further comprising:

determining new errors, P_0' ~~by performing temperature control using, when~~
said ~~corrected~~ first target temperature is corrected; and

further correcting said ~~corrected~~ first target temperature by using said new errors, P_0' , and said interference matrix, M .

4. (currently amended) A temperature control method of controlling an apparatus, which includes a process chamber, a heating apparatus ~~having~~ including at least one heating zone for heating a treatment target provided in said process chamber, and first temperature detectors ~~provided~~, at least one of said first temperature detectors provided for each of said at least one heating zone for detecting heating temperatures provided by said heating apparatus at first predetermined locations,

wherein a power supply of said at least one heating zone is independently adjusted,
wherein said heating apparatus is controlled on ~~[[the]]~~ a basis of first detected temperatures detected by said first temperature detectors and a first target temperature for said first detected temperatures, and

wherein a plurality of second temperature detectors are disposed at second predetermined locations ~~[[the]]~~, a number of which is larger than that of said at least one heating ~~[[zones]]~~ zone and which are closer to said treatment target than said first predetermined locations, ~~said second temperature detectors being operable to detect heating temperatures provided by said heating apparatus,~~

said method, comprising:

comparing second detected temperatures detected by said second temperature detectors with a second target temperature ~~for the second detected temperatures~~ to obtain corrective values for said first target temperature; and

correcting said first target temperature by said corrective values ~~to perform temperature control.~~

5. (currently amended) The temperature control method of claim 4, wherein said corrective values are obtained before an actual process of actually treating ~~a substrate~~ said treatment target to be treated.

6. (canceled)

7. (currently amended) A method of manufacturing a semiconductor device, in which a target substrate is subjected to a heating process by controlling a heating apparatus ~~having,~~ including at least two heating zones, in such a manner that temperatures detected at predetermined locations equal a target temperature ~~therefor,~~ said method, comprising:

detecting temperatures at said predetermined locations ~~[[the]],~~ a number of which is larger than ~~[[the]]~~ a number of said at least two heating zones and at least one of which is located in each of said at least two heating zones; and

controlling said heating apparatus in such a manner that said target temperature, detected at said predetermined location, falls between a maximum value and a minimum value ~~of a plurality of temperatures detected at a plurality of predetermined locations,~~

wherein power supplies of said at least two heating zones are independently adjusted.

8. (new) A temperature control method for a furnace, including a plurality of heating zones, comprising:

controlling a first temperature of each of said plurality of heating zones, detected by a corresponding plurality of first temperature detectors, by a corresponding one of a plurality of heating elements to equal a first target temperature;

detecting a plurality of second temperatures at each of a plurality of second temperature detectors, a number of said plurality of second temperature detectors being greater than a number of said plurality of first temperature detectors, said plurality of second temperature detectors being located in greater proximity to a target than said plurality of first

temperature detectors, and at least one of said plurality of second temperature detectors being located in each of said plurality of heating zones;

independently and sequentially varying said first temperature of each of said plurality of heating zones to a varied first temperature, which does not equal said first target temperature;

subsequently detecting a plurality of varied second temperatures by each of said plurality of second temperature detectors;

determining an interference matrix, M , in a temperature controller that defines a mathematical relationship between a first difference of said first temperature of each of said plurality of heating zones and a second difference of each of said plurality of second temperatures; and

minimizing errors, P_0 , between said plurality of second temperatures and said first target temperature of each of said plurality of heating zones.

9. (new) The temperature control method of claim 8, further comprising using said minimizing errors, P_0 , to adjust each of said plurality of heating elements according to said interference matrix, M , to provide a second target temperature for each of said plurality of heating zones.

10. (new) The temperature control method of claim 9, further comprising:
detecting a plurality of third temperatures at each of a plurality of second temperature detectors; and

minimizing new errors, P_0' , between said plurality of third temperatures and said second target temperature of each of said plurality of heating zones.

11. (new) The temperature control method according to claim 1, wherein a plurality of first temperature detectors are disposed at and correspond in number to said plurality of first predetermined locations and are used to detect if each of said plurality of first temperature detectors equals said first target temperature.

12. (new) The temperature control method according to claim 1, wherein a plurality of

second temperature detectors are disposed at and correspond respectively to said plurality of second predetermined locations, which are located closer to a treatment target than said plurality of first predetermined locations.

13. (new) The temperature control method according to claim 12, wherein said plurality of second temperature detectors are used to obtain an interference matrix, M , as well as errors, P_0 , between a plurality of second target temperatures for said plurality of second temperature detectors and said plurality of second temperatures detected by said plurality of second temperature detectors.

14. (new) The temperature control method according to claim 13, wherein said interference matrix, M , includes coefficients indicative of variations of said plurality of second temperatures detected by said plurality of second temperature detectors, when said plurality of first target temperatures is varied.

15. (new) The temperature control method according to claim 1, wherein said plurality of first target temperatures is corrected on a basis of said interference matrix, M , and said errors, P_0 .

16. (new) A temperature control method of controlling a heating apparatus that includes a plurality of heating zones for heating a treatment target located in a process chamber and each of said plurality of heating zones includes one of a plurality of first temperature detectors located at one of a plurality of first predetermined locations, said temperature control method, comprising:

controlling each of a plurality of first temperatures that correspond respectively to each of said plurality of first predetermined locations, such that a plurality of first target temperatures is attained; and

comparing each of a plurality of second temperatures detected by a corresponding one of a plurality of second temperature detectors with a second target temperature to obtain corrective values for said plurality of first target temperatures,

wherein said plurality of second temperatures are detected at a corresponding

plurality of second predetermined locations, a number of which is larger than that of said plurality of heating zones and which are closer to said treatment target than said plurality of first predetermined locations.

17. (new) The temperature control method according to claim 16, further comprising correcting each of said first target temperatures by said corrective values.